



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/531,873

08/10/2005

Yasushi Uchida

123559

4539

25944 7590 06/24/2009

OLIFF & BERRIDGE, PLC

P.O. BOX 320850

ALEXANDRIA, VA 22320-4850

EXAMINER

GUGLIOTTA, NICOLE T

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

06/24/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/531,873	Applicant(s) UCHIDA ET AL.	
	Examiner NICOLE T. GUGLIOTTA	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 March 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 7,9,11 and 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 7,9,11 and 13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Examiner's Note

1. Examiner acknowledges the amendments to claims 11 and 13. Claims 7, 9, 11 and 13 are currently pending.
2. Examiner notes the "Tomita et al" used in the present rejection (WO 02/40423) is not the same "Tomita et al." of a previous office action discussed in "Response to Arguments" below (WO 02/081406), which Examiner has withdrawn due to Applicants' persuasive arguments.

Double Patenting

3. Examiner acknowledges the approved Terminal Disclaimer filed on March 6, 2009 by Applicants. Therefore, the obvious type double patenting rejection over copending U.S. Patent Application 10/531,578 is withdrawn.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

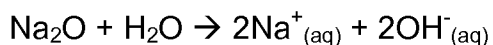
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. **Claims 7 & 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joulin et al. (U.S. Patent No. 6,582,796 B1).**

Art Unit: 1794

6. In regard to claim 7, Joulin et al. disclose monolith honeycomb structures comprising silicon carbide, a bonding phase consisting of at least one simple oxide, a pore forming agent, an organic plasticizer (binder), and water (Col. 3, Lines 20 – 28). The paste comprising the above components is extruded (Col. 3, Lines 53 - 57), dried (Col. 3, Lines 58 - 63), and calcined (Col. 4, Lines 1 - 7) and fired (Col. 4, Lines 13 - 14). Joulin et al. further disclose 3- 30% by mass of at least one bonding ceramic phase (alkali metal source) in the form of a micronic powder and/or particles that are obtained by atomization, comprising at least one simple oxide that is selected from K_2O and Na_2O (Column 2, Lines 10 - 19), among other compounds, to a mix containing silicon carbide (Column 2, Lines 6 – 8) for making a ceramic honeycomb structure to be formed, dried and heated.

Joulin et al. teach the use of oxides such as Na_2O and K_2O . Examiner notes the chemical reaction of an alkali metal oxide in an aqueous slurry yields alkali metal hydroxides as the intermediate product (shown below). Therefore it would have been obvious to one of ordinary skill in the art to use an alkali metal hydroxide powder in place of an alkali metal oxide, based upon the disclosure of Joulin et al.



Assuming 100% yield of the above reaction, 3 – 30% by mass Na_2O would yield 4 - 39% parts by mass $NaOH$. This range overlaps with Applicants' claimed range of 0.1 - 10 parts by mass. It is well established, however, that the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected the overlapping portion of

Art Unit: 1794

the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 USPQ 549.

In addition, Examiner admits the formation of KOH or NaOH in Joulin et al. is “*in-situ*”, and not as a raw material. However, Examiner considers this issue to be a matter of mixing the ingredients together before adding to the slurry (as Applicants claims), or allowing the mixing to occur within the slurry (as Joulin et al. disclose). According to MPEP 2144.04 [R-6], the selection of any order of mixing ingredients is *prima facie* obvious, see *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930).

7. In regard to claim 9, Joulin et al. disclose the amount of silicon carbide to be as great as 97% by mass (Col. 2, Lines 6 – 8).

8. **Claims 11 & 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Joulin et al., as evidenced by MSDS for sodium oxide, in view of Tomita et al. (WO 02/40423).**

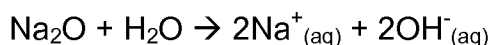
9. ***Note: US 2003/0021949 A1 is used herewith as an English language equivalent for WO 02/40423.***

10. In regard to claim 11, Joulin et al. Joulin et al. disclose monolith honeycomb structures comprising silicon carbide, a bonding phase consisting of at least one simple oxide, a pore forming agent, an organic plasticizer (binder), and water (Col. 3, Lines 20 – 28). The paste comprising the above components is extruded (Col. 3, Lines 53 - 57), dried (Col. 3, Lines 58 - 63), and calcined

Art Unit: 1794

(Col. 4, Lines 1 - 7) and fired (Col. 4, Lines 13 - 14). Joulin et al. further disclose 3- 30% by mass of at least one bonding ceramic phase (alkali metal source) in the form of a micron powder and/or particles that are obtained by atomization, comprising at least one simple oxide that is selected from K_2O and Na_2O (Column 2, Lines 10 - 19), among other compounds, to a mix containing silicon carbide (Column 2, Lines 6 – 8) for making a ceramic honeycomb structure to be formed, dried and heated.

According to the Material Safety Data Sheet (under the subheadings “Important Data” & “Chemical Dangers”) for sodium oxide, sodium oxide “reacts violently with water to produce sodium hydroxide.” The reaction of sodium oxide and water is exothermic and therefore it would be reasonable to believe the sodium oxide would react with the water within the ceramic paste *in situ* to produce sodium hydroxide before the steps of calcinating or firing because it is not an endothermic reaction (the reaction of sodium oxide with water does not need heat energy to produce sodium hydroxide).



Assuming 100% yield of the above reaction, 3 – 30% by mass Na_2O would yield 4 - 39% parts by mass $NaOH$. This range overlaps with Applicants' claimed range of 0.1 - 10 parts by mass.

Joulin et al. is silent in regard to the presence of metal silicon mixed with the silicon carbide aggregate material of their honeycomb. However, Tomita et al. disclose mixing metallic silicon with silicon carbide to be advantageous in honeycombs used as diesel particulate filters (DPFs):

Art Unit: 1794

“...the present silicon carbide-based porous body uses metallic silicon for bonding between silicon carbide particles which are refractory particles; therefore, it has a high thermal conductivity as compared with conventional structures using a vitreous material for bonding between refractory particles and accordingly, when used, for example as a DPF and subjected to combustion of the particles deposited on the filter, for filter reactivation, there occurs no local temperature increase as to damage the filter” (paragraph [0026]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to mix metallic silicon with the silicon carbide of Joulin et al. in order to improve the bonding between the silicon carbide particles and thus increase thermal conductivity, as taught by Tomita et al.

11. In regard to claim 13, Joulin et al. disclose the amount of silicon carbide to be as great as 97% by mass (Col. 2, Lines 6 – 8).

Response to Arguments

TOMITA ET AL. (WO 02/081406 & English equivalent US 2004/0033893)

12. Applicant argues, "Tomita discloses that when the eutectic point between the metal element and silicon dioxide is below 1,200°C wettability improvements and contact area enlargement are hardly obtained...Submitted herewith are phase diagram charts of Na₂O-SiO₂ and K₂O-SiO₂ systems, establishing that the eutectic points for sodium or potassium and silicon dioxide are not higher than 1000°C" (Remarks, Pg 6).

Examiner notes the phase diagrams submitted by Applicants demonstrate the eutectic point for water glass (based upon Na₂O-SiO₂ and K₂O-SiO₂) is not higher than 1,000°C. Therefore, Applicant's arguments, see Remarks, filed

Art Unit: 1794

March 7, 2009, with respect to Tomita et al. and Stobbe et al. have been fully considered and are persuasive. The rejection of claims 7, 9, 11, and 13 over Tomita et al. and Stobbe et al. has been withdrawn.

13. Applicant argues, "Tomita teaches that as a result of the contact of at least four silicon carbide particles with metallic silicon the bonded portions of the porous structure are thick and the material has high strength and high thermal conductivity...One of ordinary skill in the art would recognize that the presence of a pore forming agent would sterically disrupt and not allow for the contact of at least four silicon carbide particles with metallic silicon and, thus, not result in the high strength silicon carbide-based porous material of Tomita" (Remarks, Page 7).

Applicants' arguments, see Remarks, filed March 7, 2009, with respect to Tomita et al. and Stobbe et al. have been fully considered and are persuasive. The rejection of claims 7, 9, 11, and 13 over Tomita et al. and Stobbe et al. has been withdrawn.

JOULIN ET AL.

14. Applicants argue, "...independent claim 7 is a method claim that requires the adding of KOH or NaOH as a raw material, rather than the *"in-situ"* formation of KOH or NaOH as may occur in Joulin after the addition of a simple oxide.

Joulin does not disclose "adding" of KOH or NaOH as a raw material, as required

Art Unit: 1794

by claim 8, and the Office Action acknowledges that formation of KOH and NaOH would only occur *in-situ*" (Remarks, Page 8).

Applicants' arguments have been fully considered but they are not persuasive. As discussed previously, $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{Na}^+_{(\text{aq})} + 2\text{OH}^-_{(\text{aq})}$ (NaOH). It would be reasonable to believe the sodium oxide and water in the paste disclosed by Joulin et al. yields sodium hydroxide *in situ*. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the addition of sodium oxide in Joulin et al. with sodium hydroxide because the substitution would yield the same ceramic mixture for forming a honeycomb structure.

15. Applicants argue, "...the Office Actions reliance on *In re Gibson* is misplaced. MPEP 2144 (III) states that if the facts in a prior legal decision are sufficiently similar to those in an application under examination, the examiner may use the rationale used by the court. In *In re Gibson*, it was conceded that the ingredients and the proportions of those ingredients were the same. See *In re Gibson*, 39 F.2d 975 (CCPA 1930). In the present rejection, the ingredients and the proportions of those ingredients are not the same. The Office Action even admits that the raw material of Joulin is not KOH or NaOH. See Office Action, page 6. Therefore, the facts of *In re Gibson* are not sufficiently similar to those in the instant case for The Office Action to use the rationale set forth in *In re Gibson*" (Remarks, Page 9).

Art Unit: 1794

Applicants' arguments have been fully considered but they are not persuasive. First, the ingredient is the same: sodium hydroxide. The difference between the prior art and Applicant's invention is step in which the sodium hydroxide is produced. Applicant produces the sodium hydroxide outside of the mixture and then adds the sodium hydroxide to the ceramic mixture. It is reasonable to believe the prior art (Joulin et al.) produces the sodium hydroxide *in vitro*, as previously discussed: $\text{Na}_2\text{O} + \text{H}_2\text{O} \rightarrow 2\text{Na}^+_{(\text{aq})} + 2\text{OH}^-_{(\text{aq})}$ (also known as: NaOH or sodium hydroxide).

Second, Applicants' claim limitation teaches adding approximately the same amount of sodium hydroxide to their ceramic mixture as is produced *in situ* in the disclosure of Joulin et al., as discussed above. Examiner acknowledges in the previous action (and above) that 4 – 39% by mass NaOH is produced when the sodium oxide reacts with the water of the paste, disclosed by Joulin et al. It would have been obvious to one of ordinary skill in the art at the time of the invention to add a proportional amount of sodium hydroxide or potassium hydroxide to the mixture as would have been produced by sodium oxide and water *in situ*. The rearrangement of steps has been held to be *prima facie* obvious, as discussed above. The rearrangement of steps being the sodium hydroxide is produced and added to the mixture beforehand, rather than *in situ*, in the same amounts.

16. Applicants argue, "Joulin teaches the use of significantly more alkaline metal, which is unfavorable in independent claims 7 and 11. It appears that the

Art Unit: 1794

Office Action may be taking Official Notice that an alkali metal source of KOH or NaOH, as recited in claim 7 and 11, will behave identically as simple oxides of Joulin if replaced. To the extent the assertions in the Office Action are based on official notice, such bases are not properly established and are thus improper.

“With respect to Official Notice, the MPEP states that ‘such rejections should be judiciously applied’ (see MPEP § 2144.03). ‘Official notice without documentary evidence to support an [E]xaminer’s conclusion is permissible only in some circumstances’ (see MPEP § 2144.03 (A)). ‘It would not be appropriate for the [E]xaminer to take official notice of facts without citing a prior art reference where the facts asserted to be well known are not capable of instant and unquestionable demonstration as being well-known’ (see *Id.*, emphasis added).

“Here, the application of Official Notice is not established and, thus is improper at least because Joulin discloses that 18 – 15% of a simple oxide achieves ideal results, whereas the present specification discloses that when alkaline metal exceeds the range recited in claims 7 and 11, as in comparative example 3 (14% KOH), the alkali silicate glass formed by the alkaline metal fills in the pores of the calcinated body, and porosity unfavorably decreases. See specification, page 11, line 23 - page 12, line 2. Thus, it appears simple oxides will not behave identically as KOH or NaOH” (Remarks, Pages 9 - 10).

17. Applicants’ arguments have been fully considered but they are not persuasive. Examiner has not taken Official Notice. Examiner has pointed out sodium oxide would form sodium hydroxide when mixed with water (as supported by the MSDS for sodium oxide), and that it would be reasonable to believe the

Art Unit: 1794

sodium oxide when mixed with water in the disclosure of Joulin et al. would therefore produce sodium hydroxide. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add sodium hydroxide instead of sodium oxide to the ceramic mixture.

18. Applicants argue, "...claim 11 is amended to more clearly distinguish over the applied references...Joulin fails to teach or render obvious, or establish any reason or rationale to provide, such a combination of features, as recited in claim 11. For example, Joulin does not disclose the use of metal silicon and, thus, the honeycomb structure of Joulin does not contain metal silicon and Joulin provides no reason or rationale to modify the honeycomb structure to introduce metal silicon" (Remarks, Page 8).

19. Applicants' arguments with respect to claims 11 and 13 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

20. Applicants' amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory

Art Unit: 1794

action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NICOLE T. GUGLIOTTA whose telephone number is (571)270-1552. The examiner can normally be reached on M - F 8:30 - 6 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on 571-272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/David R. Sample/
Supervisory Patent Examiner, Art Unit 1794

NICOLE T. GUGLIOTTA
Examiner
Art Unit 1794